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Strategic Bidding of Retailers in Wholesale Energy Markets: A Model Using Hybrid Forecast Methods

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Summary

This article is devoted to the agent model of Retailers, focusing on their strategic bidding process of considering the following models: i) a risk management; ii) imbalance Settlement; iii) trading strategies; iv) bilateral trading; v) hybrid forecasts. Specifically, the theoretical work presented in the paper includes a description of the retailer agent model, designed for bilateral and spot trading based on strategic bidding. Agent-based retailers are equipped with trading strategies, utility functions, a bilateral trading model that enables them to propose and negotiate different types of bilateral contracts, and a strategic bidding model to submit bids to spot wholesale markets. The strategic bidding process uses two different hybrid forecast methodologies: a historical hourly comparison of consumption based on days with similar meteorological conditions and a short-run trend considering the typical consumption behaviour of consumers. The second methodology is used in the day-ahead forecasts. The last methodology is used in the spot intraday forecasts. The highlights comprise:

Highlights

- A model that manages the portfolios of retailers agents, using risk management and trading strategies;
- The development of a strategic bidding process that aims at satisfying the energy needs of customers, by submitting bids to wholesale markets with the goals of reducing the costs of their energy by reducing forecast errors, unbalances, and penalties;
- The practical work of the article includes a case study that tests the strategic bidding process and compares its results with regulated tariffs. The case study involves six retailers and 312 Portuguese medium voltage consumers. The consumption and the Iberian market of electricity data from 2012 and 2013 was used to compute the market results of retailers.

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